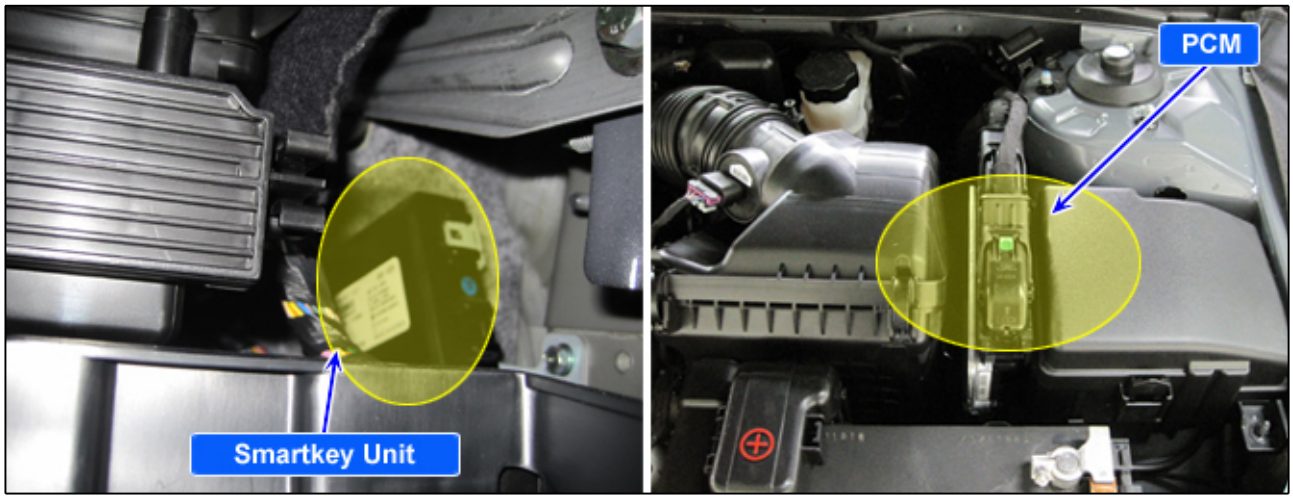
## P1676 Immobilizer-Smartra Message Error

Component Location




VG12SK50P167611

### General Description

1. The secret key code is porgrammed in memory of Smart Key ECM, ESCL, PDM, FOB key
2. The learnt FOB Key identifiers are stored in Smart Key ECM and PDM memory.
3. Corresponding PIN code is learnt and memorized in the Engine ECM

Communication between smart key ECM and ECM has 2 phase that is IG ON and Engine ON.

After this first IG ON transition phase or starting phase, a commnication between Smart Key ECM and Engine ECM takes place.

■ IG ON Phase (FOB key or Fob Key in Fob holder)

1. Communication between Smart key ECM and ECM starts from wake-up signal from ECM.
2. After receiving wake-up signal from ECM, Smart Key ECM sends lock or unlock starting signal to ECM.

■ Starting Phase (FOB key or FOB key in Fob Holder)

1. In case driver tries to start engine, although Engine ECM is locked status for starting at IG ON, Engine ECM should send re-authentication to Smart Key ECM. According to the results of re-authentication, it would be decided to start engine or not.

   he Engine ECM controls the engine, in a normal way for starting and running, and starts communication with the Smart Key ECM, sending a PIN request to the Smart Key ECM and waiting for valid release message from it until the release time period has ended.

   In case of Smart Key ECM immobilizer function is locked, the Smart Key ECM answer is the no release message. Engine ECM enters in the locked state, which causes theactivation of the imobilization actions of the engine.

   In case of Smart Key ECM immobilizer function state is released, the Smart Key ECM answer is the release message, including the information Smart Key ECM inlearnt mode and the PIN code.

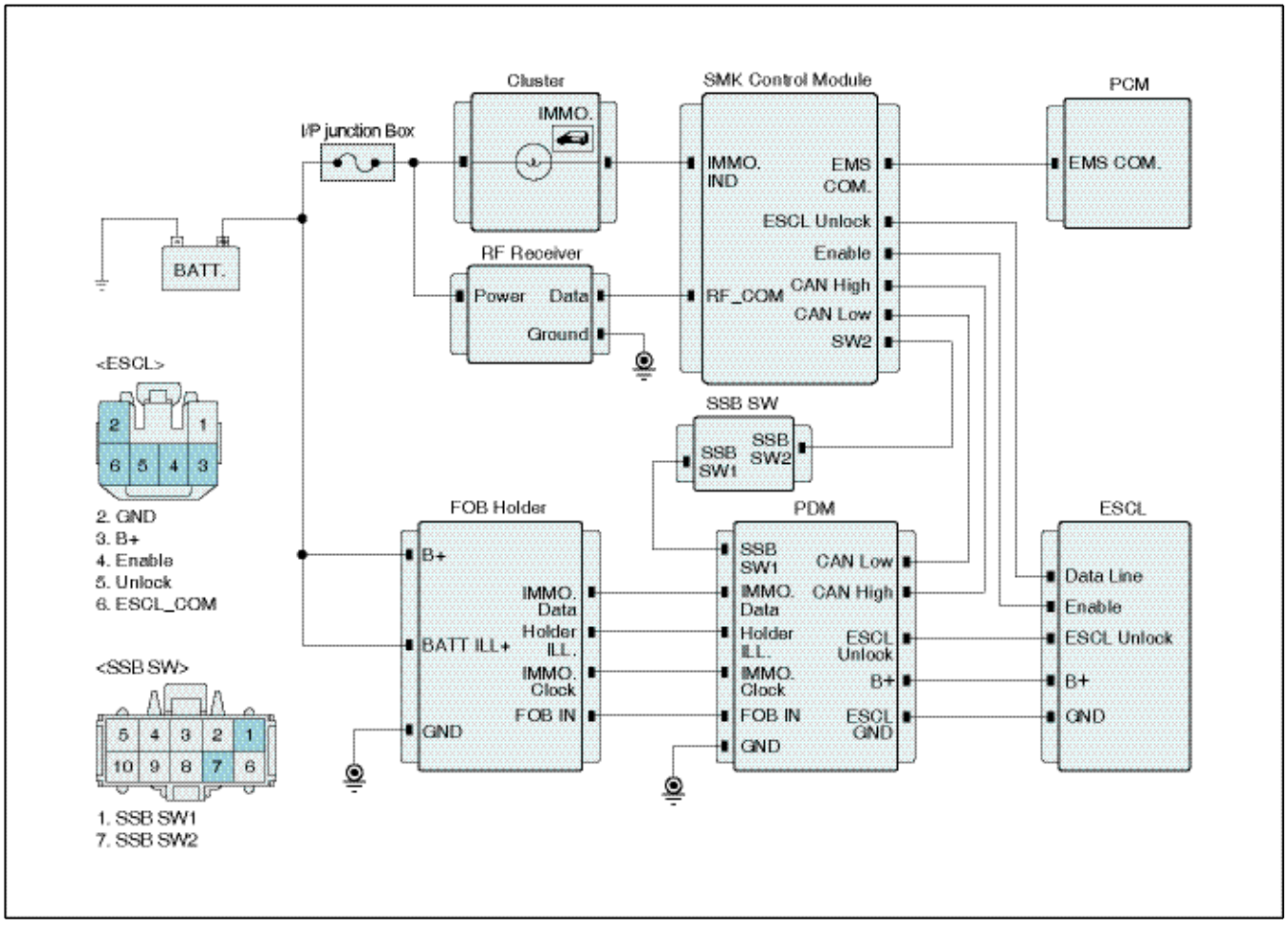
### DTC Description

This DTC is set, after Engine ECM sends wake-up signal, if response signal from Smart key ECM is abnormal structure or is not valid message during engine ECM communication.

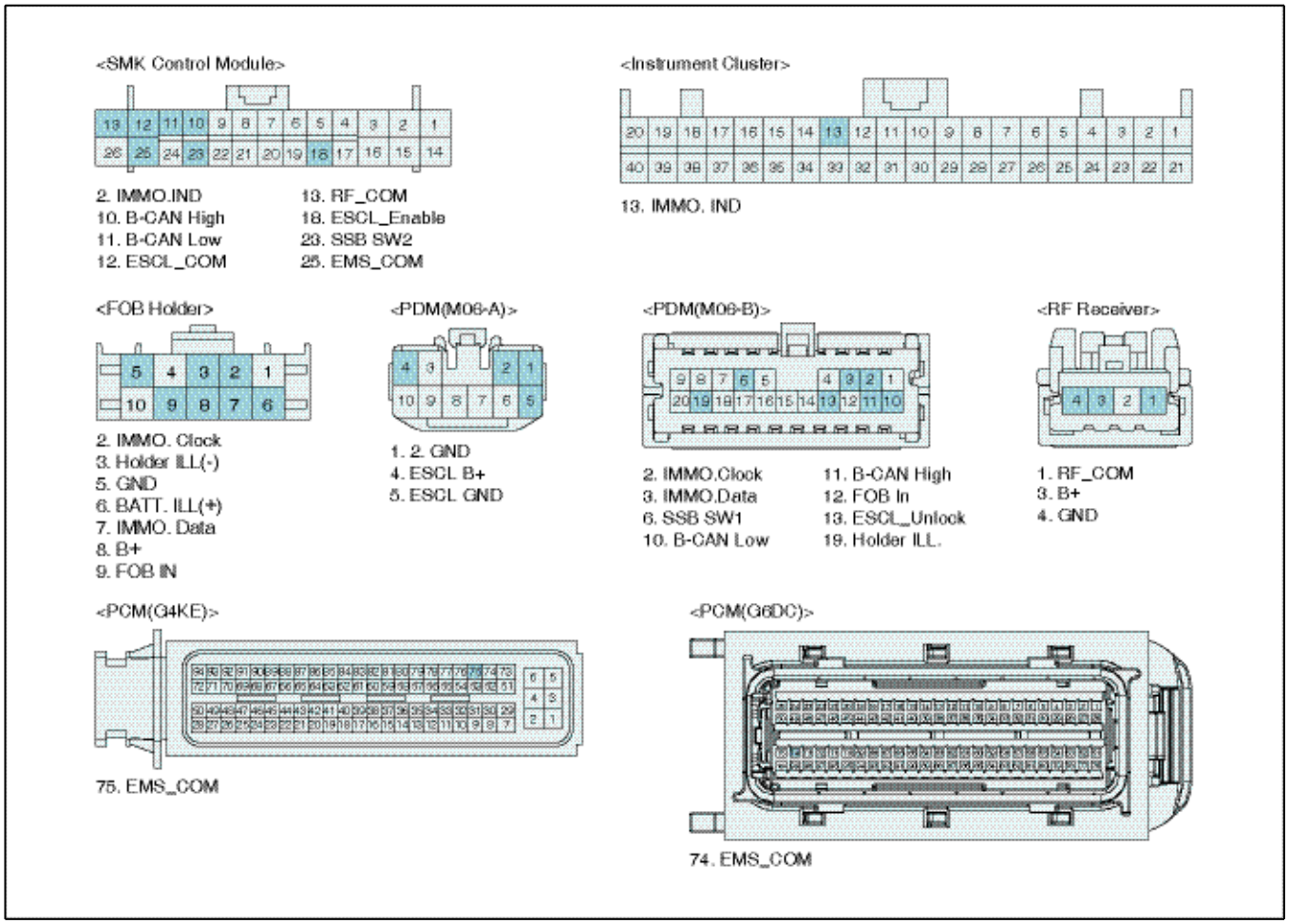
## DTC Detecting Condition

| Item | Detecting Condition | Possible Cause |
|---|---|---|
| Enable Conditions | • IG ON | 1. Faulty Smart Key ECM |
| Detecting time | • 1.5 sec. | |
| Threshold value | • Data error or timing error<br>1. Data error : Head value error, checksum value error, Smart Key status unknown error<br>2. Timing Error : Interval time of response from Smart key ECM after ECM request signal is longer than 40mS | |

## Diagnostic Circuit




VG12SK50P1676D




VG12SK50P1676D1

## Monitor Scantool Data

1. IG KEY "ON" & Engine "OFF".
2. Erase DTC after connecting GDS.
3. Check Smart key status if DTC is retrieved.

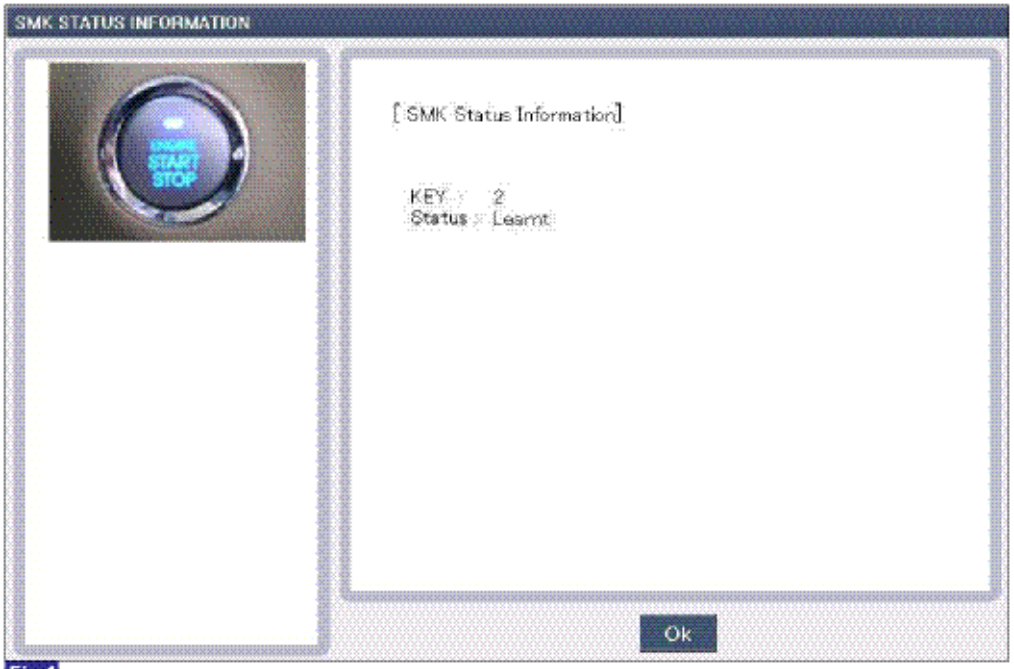



Fig.1

SXMBE10K11L

Fig.1) It shows that 2(two) FOB key is registered, Smart Key ECM is learnt status.

4. Is the Smart key ECM learnt status ?

**YES** ▶ Fault is intermittent caused by poor contact in Smart key ECM and/or PCM connector or was repaired and Smart key ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to " Verification of Vehicle Repair" procedure.

**NO** ▶ Go to "Component Inspection" procedure.

## Component Inspection

### ■ Check Smart Key ECM Insepction

1. IG KEY "ON" & Engine "OFF"
2. Neutralize smart key ECM with GDS.
3. Perform key teaching procedure for smart key ECM with GDS.

   ⚠CAUTION
   Pin code must be prepared to Neutralize Smart Key ECM and to perform key teaching procedure.
4. Is the neutralization of Smart Key ECM, Engine ECM and key teaching normal ?

**YES** ▶ Fault is intermittent caused by poor contact in Smart Key ECM and/or PCM's connector or was repaired and Smart key ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to " Verification of Vehicle Repair" procedure.

**NO** ▶ Substitute with a known-good Smart Key ECM and check for proper operation.
▶ If the problem is corrected, replace Smart Key ECM and then go to "Verification of Vehicle Repair" procedure.

NOTICE

■ *PIN code is programmed in Smart key ECM, Transponder, ESCL, PDM and FOB.*

1. *If the Smart key ECM is not registered with PIN, key teaching process is not proceeded*
2. *Registering PIN is available after Smart Key ECM is neutralized.*
3. *Neutralization of Engine ECM is available with GDS (Registering PIN code)*
4. *If the virgin engine ECM is installed on vehicle, Engine ECM is automatically programmed PIN code by Smart Key ECM*
5. *Registering PIN code is only possible for virgin or neutralized status.*

■ *It is possible to acess to All of the learning*

*procedue only with GDS.*

*And, FOB key must be inserted in FOB holder in order to proceed learning procedure.*

*(There is only one menu for registering Smart key on the GDS that makes registering all of the component. In case of replacing each module, New registration should be done with GDS)*

- *Smart Key ECM Learning*

  *1. Before learning procedure for FOB Key, PDM or ESCL, Smart Key ECM should be registered PIN code first.*

  *2. In case of replacing Smart Key ECM, All of the keys should be newly registered again.*

  *3. In case that Smart Key ECM receives 3 times with wrong PIN, It is not allowed for neutralization and Key Teaching for 1 hour.*

  *4. If the battery is discharged during neutralization or Teaching, Timer will start again from begining. Therefore, it is avoidable to wail for 1 hour.*

- *PDM Learning*

  *1. It is O.K for registering PDM just one time. And, it is available for PDM to neutrailze and re-teach with same PIN code.*

  *2. In case that Power supply is shut off to ESCL right before first FOB key is registered, Every component status is moved to right before power shut off and previous PIN is used for communication with PDM and IPM*

- *ESCL Learning*

  *1. It is O.K for registering ESCL just one time. And, it is available for ESCL to neutrailze and re-teach with same PIN code.*

## Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

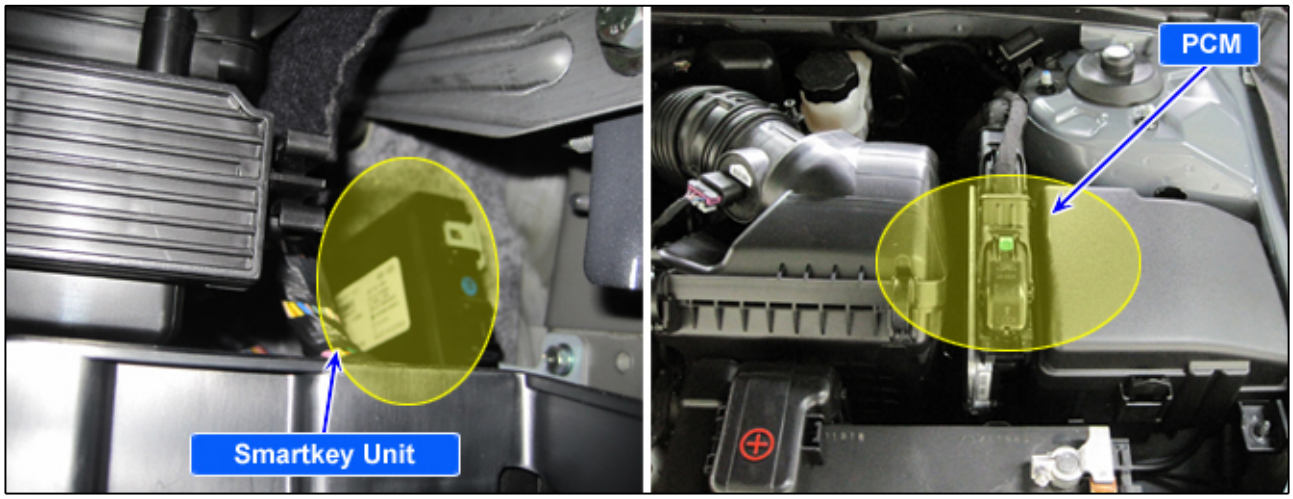
1. Connect GDS and check "No. of Key learnt, ECM status and Smartkey ECM status
2. Selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC
3. Operate the vehicle within the enable condition and monitor the DTC on the GDS.
4. Are any DTCs present ?

**YES** ▶ Go to the applicable troubleshooting procedure.

**NO** ▶ System is performing to specification at this time.

# P1690 Immobilizer-Smartra No Response

## Component Location




VG12SK50P167611

## General Description

1. The secret key code is porgrammed in memory of Smart Key ECM, ESCL, PDM, FOB key
2. The learnt FOB Key identifiers are stored in Smart Key ECM and PDM memory.
3. Corresponding PIN code is learnt and memorized in the Engine ECM

Communication between smart key ECM and ECM, has 2 phase that is IG ON and Engine ON.

After this first IG ON transition phase or starting phase, a commnication between Smart Key ECM and Engine ECM takes place.

■ IG ON Phase (FOB key or Fob Key in Fob holder)

1. Communication between Smart key ECM and ECM starts from wake-up signal from ECM.
2. After receiving wake-up signal from ECM, Smart Key ECM sends lock or unlock starting signal to ECM.

■ Starting Phase (FOB key or FOB key in Fob Holder)

1. In case driver tries to start engine, although Engine ECM is locked status for starting at IG ON, Engine ECM should send re-authentication to Smart Key ECM. According to the results of reauthentication, it would be decided to start engine or not.

   The Engine ECM controls the engine, in a normal way for starting and running, and start scommunication with the Smart Key ECM, sending a PIN request to the Smart Key ECMand waiting for valid release message from it until the release time period has ended.

   In case of Smart Key ECM immobilizer function is locked, the Smart Key ECM answer is the no release message. Engine ECM enters in the locked state, which causes the activation of the imobilization actions of the engine.

   In case of Smart Key ECM immobilizer function state is released, the Smart Key ECM answer is the release message, in cluding the information Smart Key ECM in learnt mode and the PIN code.

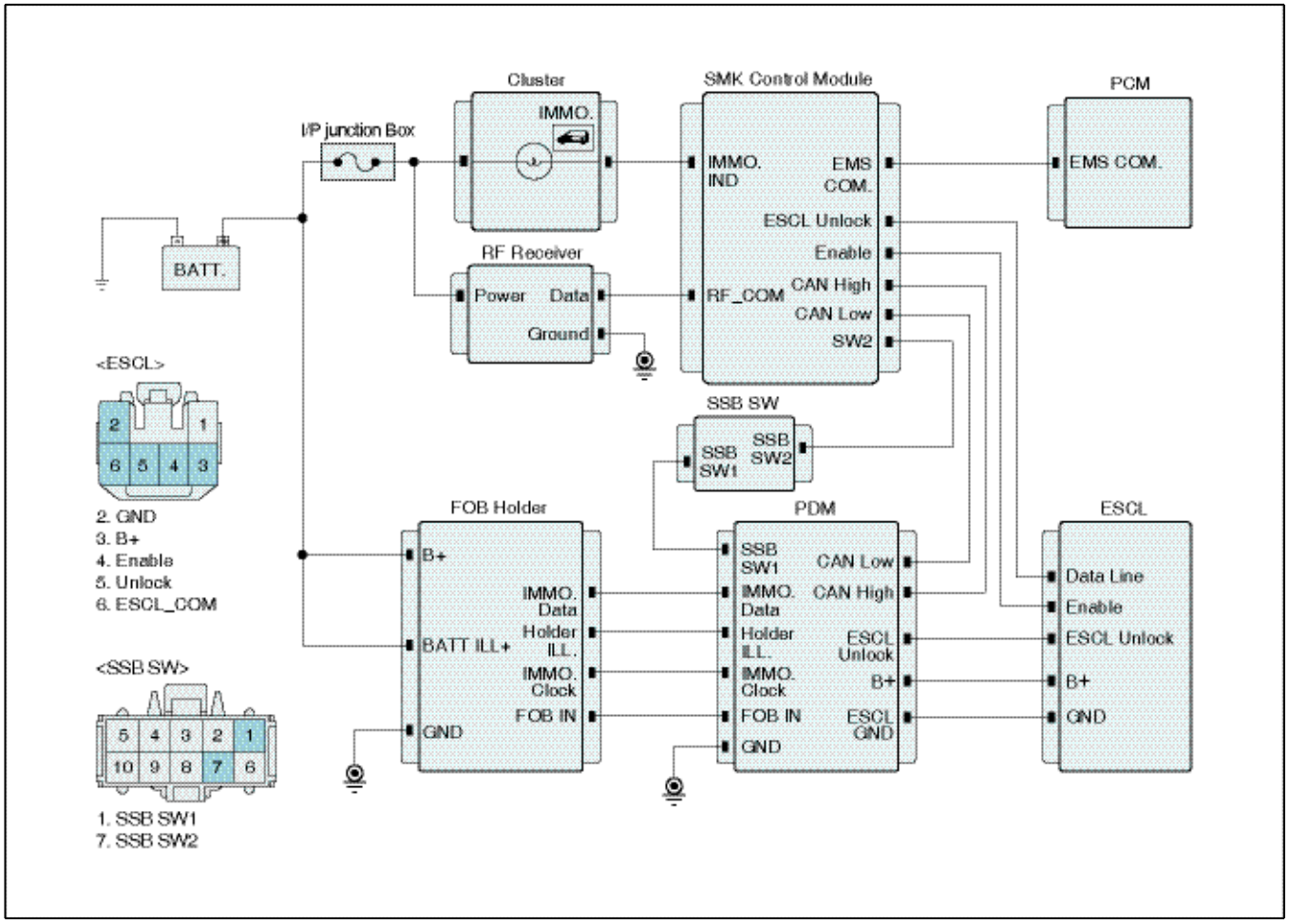
## DTC Description

DTC P1690 is set Engine ECM has not received any signals related starting engine, Although Engine ECM sends wake up signal to Smart Key ECM.

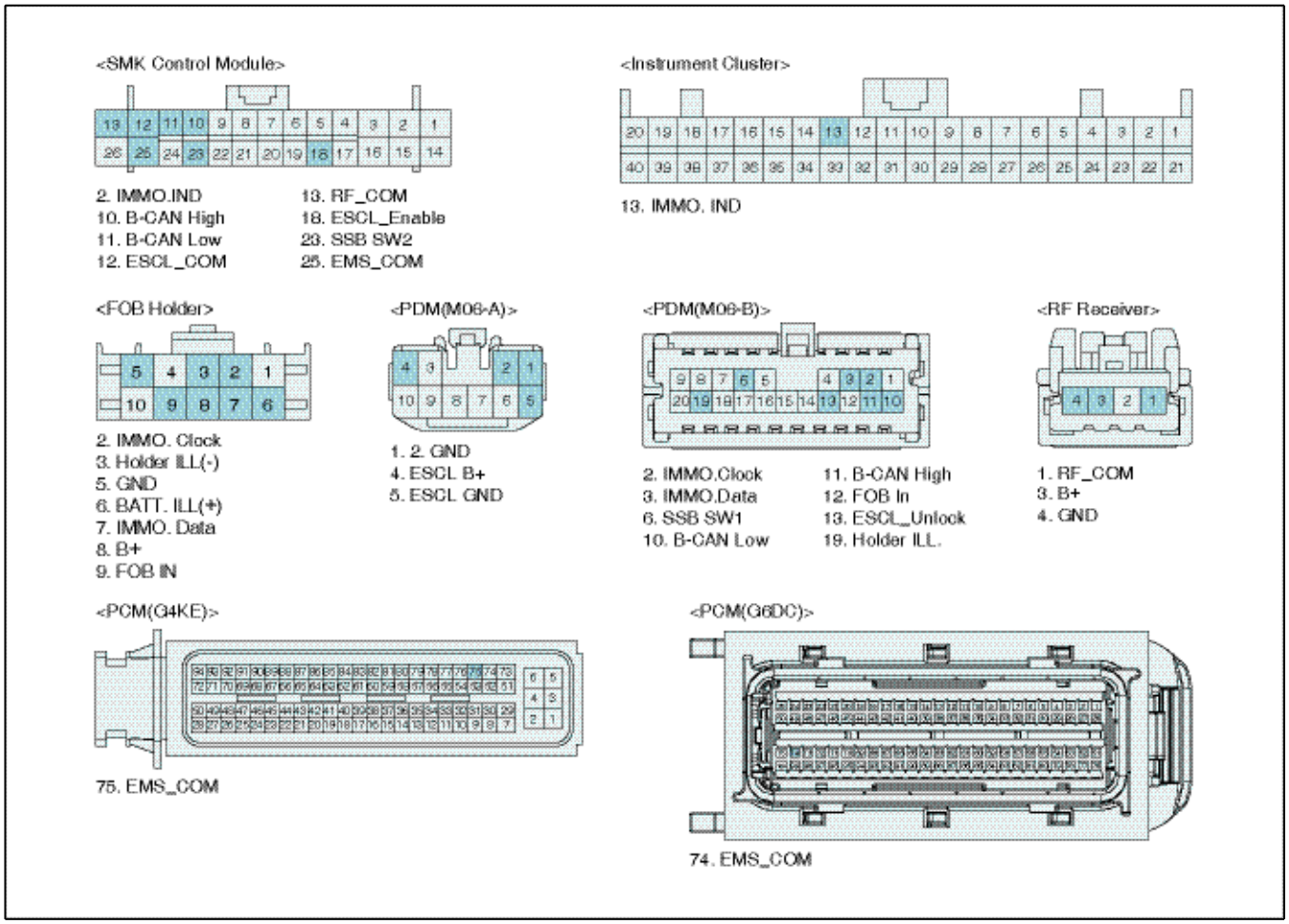
DTC Detecting Condition

| Item | Detecting Condition | Possible Cause |
|---|---|---|
| Enable Conditions | • IG ON | 1. Open or short in circuit<br>2. Faulty Smart Key ECM |
| Detecting time | • 1.5 seconds | |
| Threshold value | • No response form Smart Key ECM<br>( Communication line error -Open or short) | |

Diagnostic Circuit




VG12SK50P1676D




VG12SK50P1676D1

## Monitor Scantool Data

1. IG KEY "ON" & Engine "OFF".
2. Erase DTC after connecting GDS.
3. Check Smart Key ECM status parameter if DTC is retrieved.

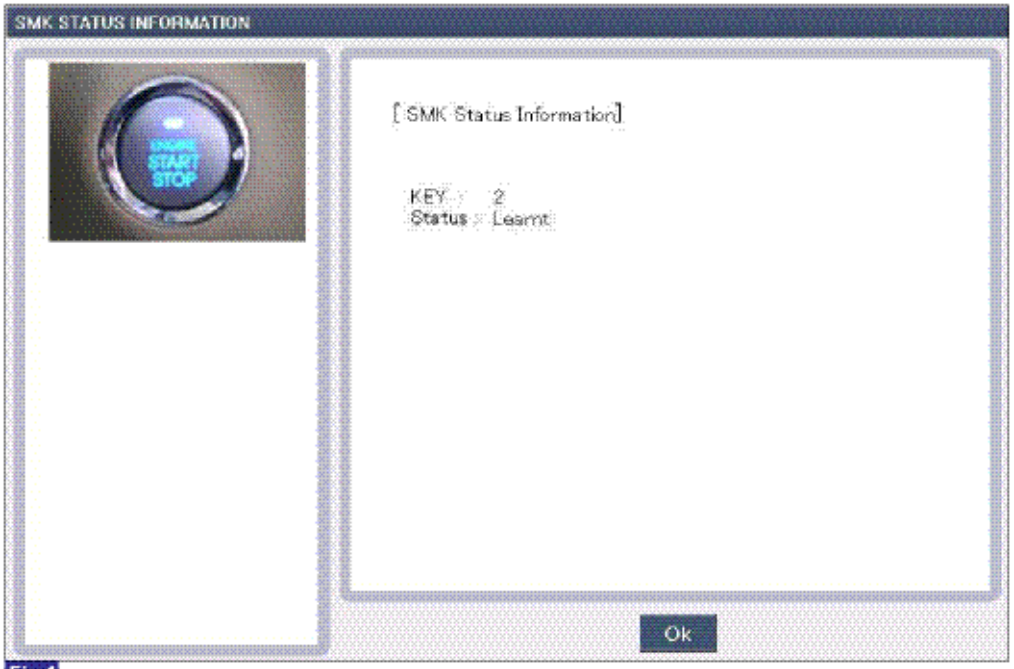



Fig.1

SXMBE10K11L

Fig.1) It shows that 2(two) FOB key is registered, Smart Key ECM is learnt status.

4. Is the smart Key ECM learnt ?

**YES** ▶ Fault is intermittent caused by poor contact in Smart key ECM and/or PCM's connector or was repaired and Smart key ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to " Verification of Vehicle Repair" procedure.

**NO** ▶ Go to "Wire Harness Inspection" procedure.

## Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminal connections.

   Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
3. Has a problem been found?

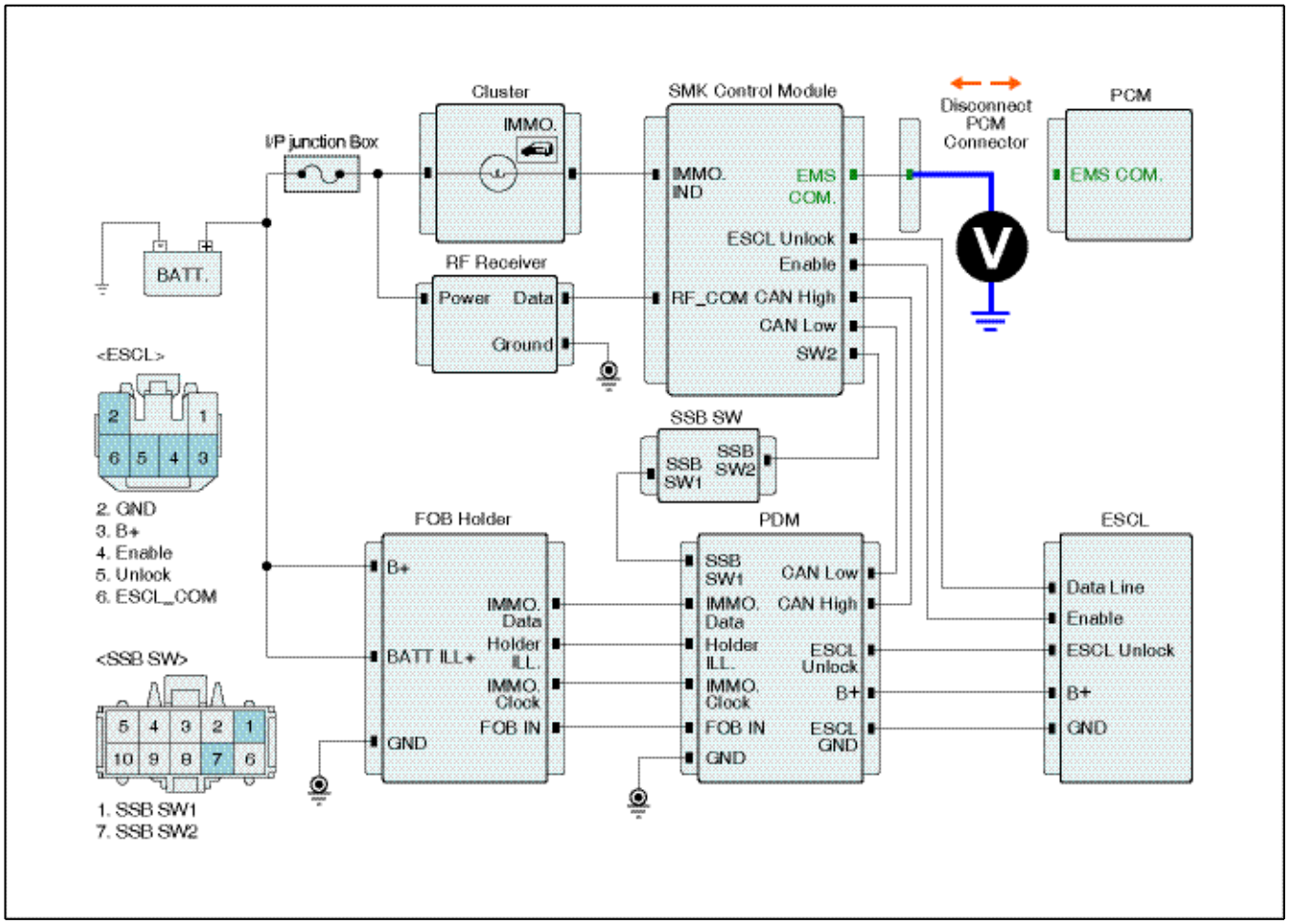
**YES** ▶ Repair as necessary and go to "Verification Vehicle Repair" procedure

**NO** ▶ Go to "Signal Circuit Inspection" procedure.

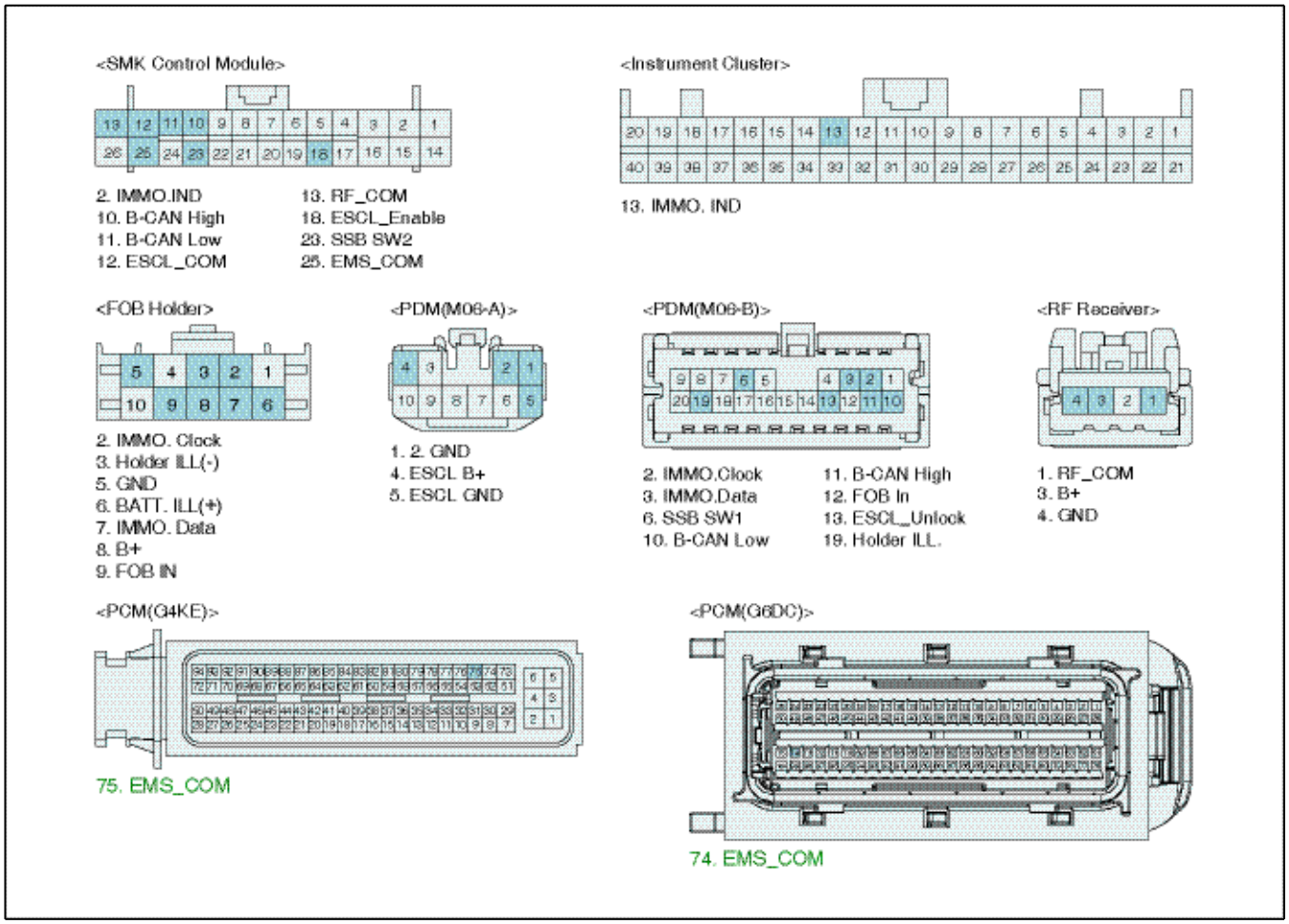
## Signal Circuit Inspection

1. IG KEY OFF.
2. Disconnect Engine PCM connector.
3. IG KEY "ON"
4. Measure voltage between signal terminal of PCM harness connector and chassis ground.

Specification : About 12V




VG12SK50P167631




VG12SK50P167631-1

5. Is the measured voltage within specification ?

**YES** ▶ Go to "Component Inspection" procedure.

**NO** ▶ Check open or short to signal circuit and then, go to "Verification of Vehicle Repair " procedure.

## Component Inspection

### ■ Check Smart Key ECM Insepction

1. IG KEY "ON" & Engine "OFF"
2. Neutralize smart key ECM with GDS.
3. Perform key teaching procedure for smart key ECM with GDS.

   ⚠CAUTION
   Pin code must be prepared to Neutralize Smart Key ECM and to perform key teaching procedure.
4. Is the neutralization of Smart Key ECM, Engine ECM and key teaching normal ?

**YES** ▶ Fault is intermittent caused by poor contact in Smart Key ECM and/or PCM's connector or was repaired and Smart key ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to " Verification of Vehicle Repair" procedure.

**NO** ▶ Substitute with a known-good Smart Key ECM and check for proper operation.
▶ If the problem is corrected, replace Smart Key ECM and then go to "Verification of Vehicle Repair" procedure.

NOTICE

■ *PIN code is programmed in Smart key ECM, Transponder, ESCL, PDM and FOB.*

1. *If the Smart key ECM is not registered with PIN, key teaching process is not proceeded*
2. *Registering PIN is available after Smart Key ECM is neutralized.*

*3. Neutralization of Engine ECM is available with GDS (Registering PIN code)*

*4. If the virgin engine ECM is installed on vehicle, Engine ECM is automatically programmed PIN code by Smart Key ECM*

*5. Registering PIN code is only possible for virgin or neutralized status.*

■ *It is possible to acess to All of the learning procedue only with GDS.*

*And, FOB key must be inserted in FOB holder in order to proceed learning procedure.*

*(There is only one menu for registering Smart key on the GDS that makes registering all of the component. In case of replacing each module, New registration should be done with GDS)*

- *Smart Key ECM Learning*

  *1. Before learning procedure for FOB Key, PDM or ESCL, Smart Key ECM should be registered PIN code first.*

  *2. In case of replacing Smart Key ECM, All of the keys should be newly registered again.*

  *3. In case that Smart Key ECM receives 3 times with wrong PIN, It is not allowed for neutralization and Key Teaching for 1 hour.*

  *4. If the battery is discharged during neutralization or Teaching, Timer will start again from begining. Therefore, it is avoidable to wail for 1 hour.*

- *PDM Learning*

  *1. It is O.K for registering PDM just one time. And, it is available for PDM to neutrailze and re-teach with same PIN code.*

  *2. In case that Power supply is shut off to ESCL right before first FOB key is registered, Every component status is moved to right before power shut off and previous PIN is used for communication with PDM and IPM*

- *ESCL Learning*

  *1. It is O.K for registering ESCL just one time. And, it is available for ESCL to neutrailze and re-teach with same PIN code.*

## Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

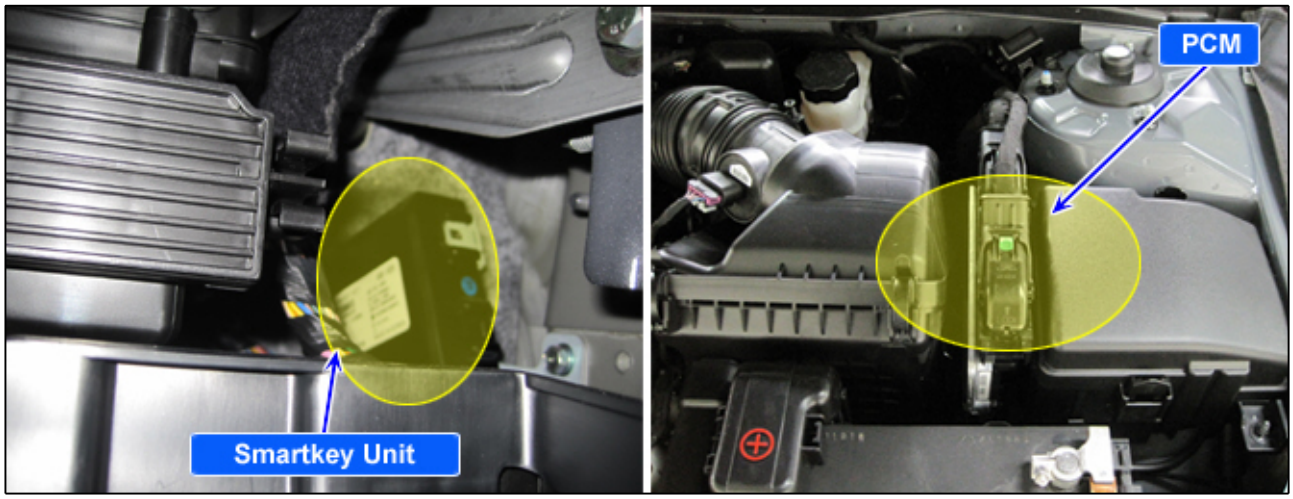
1. Connect GDS and check "No. of Key learnt, ECM status and Smartkey ECM status.
2. Selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
3. Operate the vehicle within the enable condition and monitor the DTC on the GDS.
4. Are any DTCs present ?

**YES** ▶ Go to the applicable troubleshooting procedure.

**NO** ▶ System is performing to specification at this time.

## P1695 Immobilizer-EMS Memory Error

### Component Location




VG12SK50P167611

### General Description

Information related immobilizer,that are classified as 2(two) parts independently, is memorized in EEPROM. ECM check these 2(two) information berfore proceeding immobilizer authentication. With synchronized both information, ECM starts immobilizer authentication procedure. If both information is not synchronized, ECM stops immobilizer authentication, Limphome function will not be activated, and memorizes DTC P1695. If DTC P1695 is retrieved again, after performing new key teaching procedure, ECM should be replaced with new one.

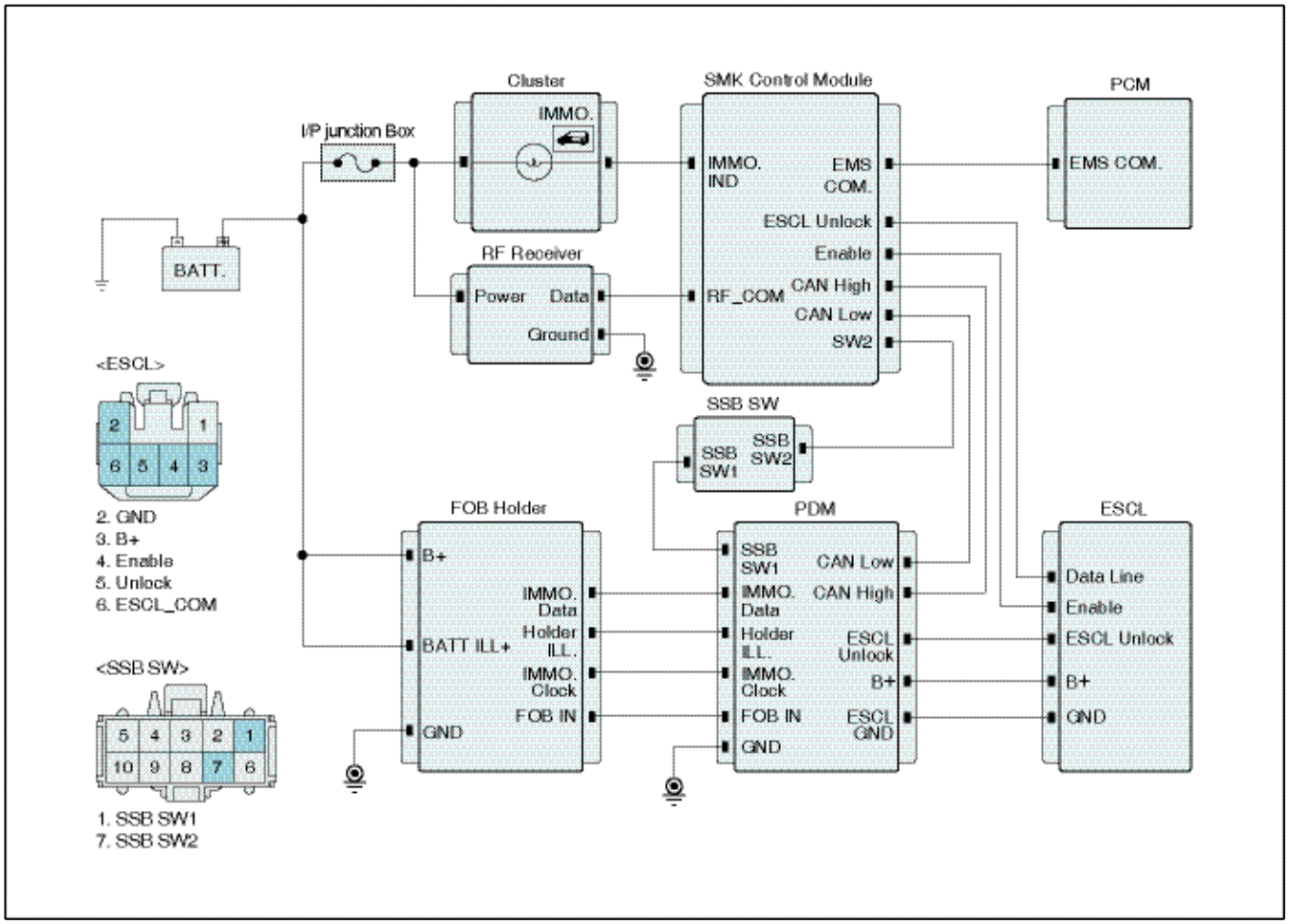
### DTC Description

If key/password information in PCM is not matching or there is write error on EEPROM as hardware, DTC P1696 is set.

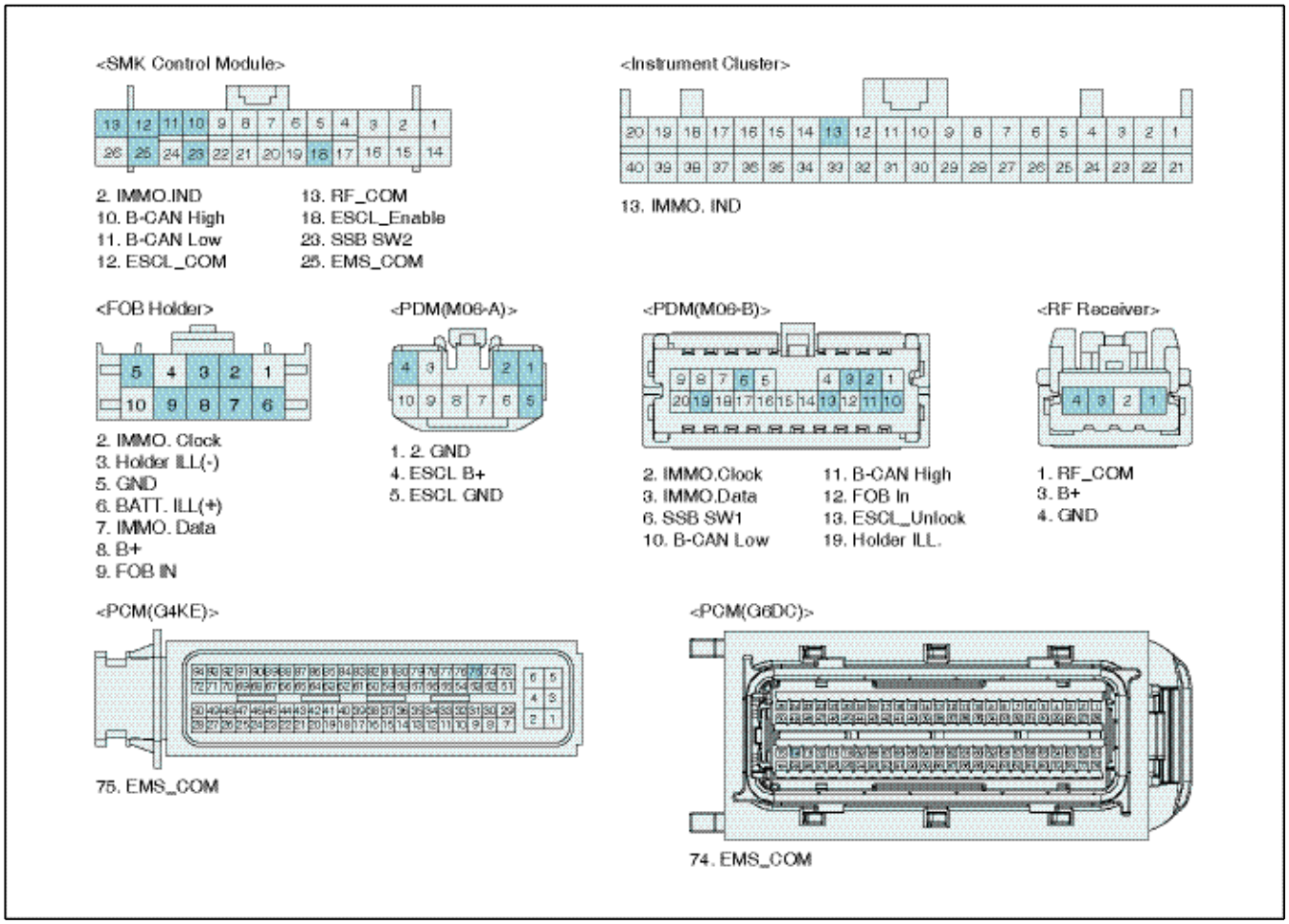
### DTC Detecting Condition

| Item | Detecting Condition | Possible Cause |
|---|---|---|
| Enable Conditions | • IG ON | 1. Faulty PCM |
| Threshold value | • PCM internal memory error(EEPROM or Flash etc.)<br>• Write error on PCM internal memory (EEPROM or Flash etc.) | |

### Diagnostic Circuit




VG12SK50P1676D




VG12SK50P1676D1

## Monitor Scantool Data

Check Smart Key unit insepction

1. IG KEY "ON" & Engine "OFF"
2. Connect GDS and select ID Register.
3. Check Engine status parameter with GDS.

⚠CAUTION

Pin code must be prepared to Neutralize Smart Key unit and to perform key teaching procedure.

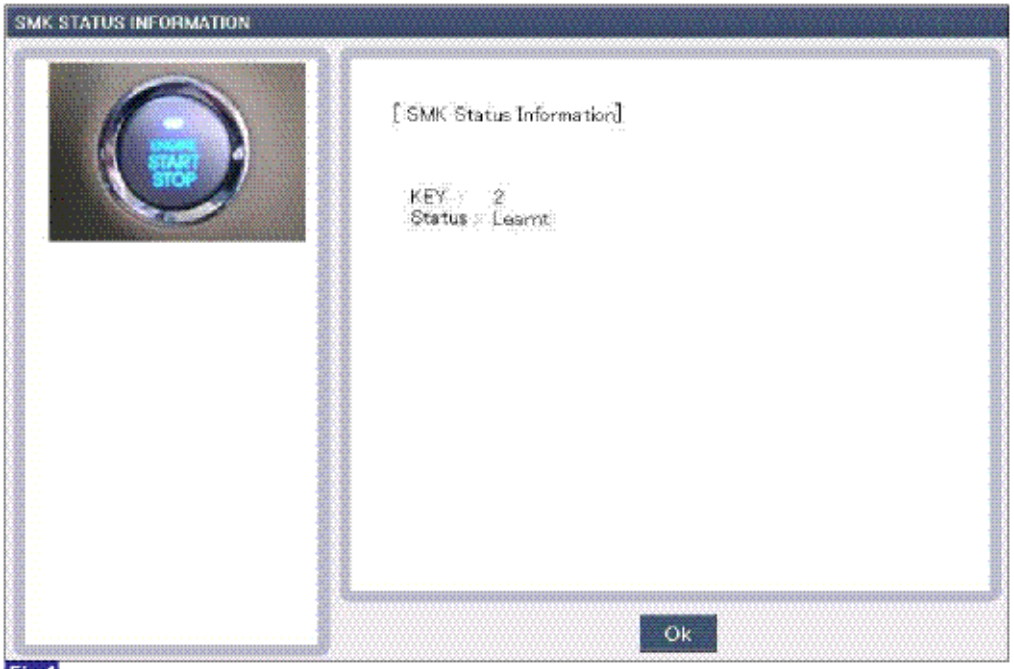



Fig.1

SXMBE10K11L

Fig.1) It shows that 2(two) FOB key is registered, Smart Key ECM is learnt status.

1. Is the smart Key unit learnt ?

**YES** ▶ Neutralize the Engine ECM after erasing the DTC with GDS.
Check that system is normal after checking the DTC againg.
(If the DTC is set aganin, repalce Engine ECM)
Wait for more than 1 min. with IG ON so that smart key ECM register PIN into Engine ECM automatically.

**NO** ▶ Perform key teaching procedure after replacing ECM and then, go to "Verification of Vehicle Repair" Procedure.

NOTICE

■ *PIN code is programmed in Smart key ECM, Transponder, ESCL, PDM and FOB.*

1. *If the Smart key ECM is not registered with PIN, key teaching process is not proceeded*
2. *Registering PIN is available after Smart Key ECM is neutralized.*
3. *Neutralization of Engine ECM is available with GDS (Registering PIN code)*
4. *If the virgin engine ECM is installed on vehicle, Engine ECM is automatically programmed PIN code by Smart Key ECM*
5. *Registering PIN code is only possible for virgin or neutralized status.*

■ *It is possible to acess to All of the learning procedue only with GDS.*

*And, FOB key must be inserted in FOB holder in order to proceed learning procedure.*

*(There is only one menu for registering Smart key on the GDS that makes registering all of the component. In case of replacing each module, New registration should be done with GDS)*

- *Smart Key ECM Learning*

  *1. Before learning procedure for FOB Key, PDM or ESCL, Smart Key ECM should be registered PIN code first.*

  *2. In case of replacing Smart Key ECM, All of the keys should be newly registered again.*

  *3. In case that Smart Key ECM receives 3 times with wrong PIN, It is not allowed for neutralization and Key Teaching for 1 hour.*

  *4. If the battery is discharged during neutralization or Teaching, Timer will start again from begining. Therefore, it is avoidable to wail for 1 hour.*

- *PDM Learning*

  *1. It is O.K for registering PDM just one time. And, it is available for PDM to neutrailze and re-teach with same PIN code.*

  *2. In case that Power supply is shut off to ESCL right before first FOB key is registered, Every component status is moved to right before*

*power shut off and previous PIN is used for communication with PDM and IPM*

- *ESCL Learning*

  *1. It is O.K for registering ESCL just one time. And, it is available for ESCL to neutrailze and re-teach with same PIN code.*

## Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

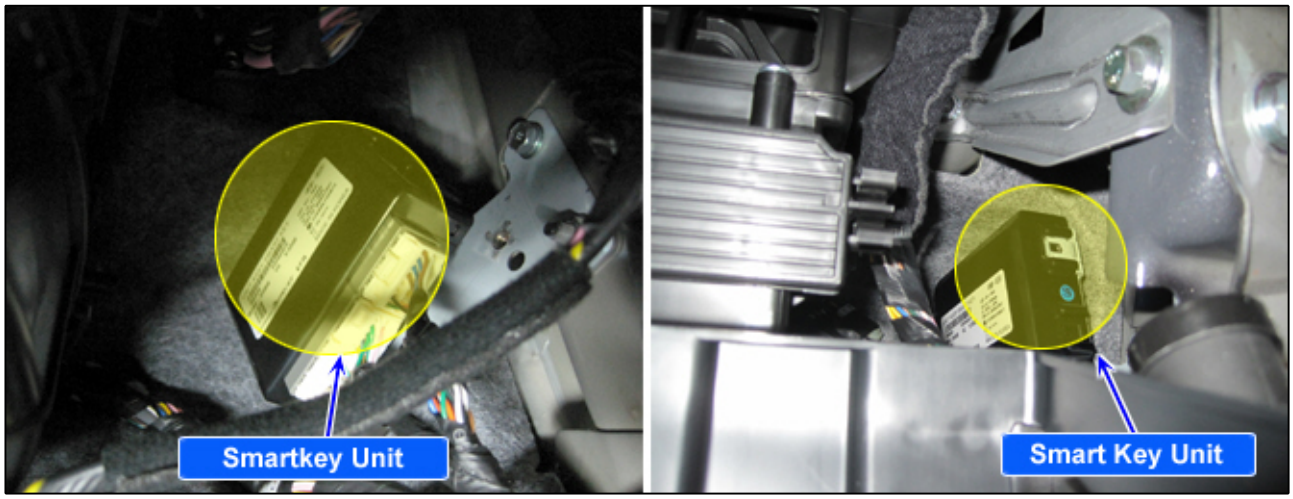
1. Connect GDS and check "No. of Key learnt, ECM status and Smartkey ECM status
2. Selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC
3. Operate the vehicle within the enable condition and monitor the DTC on the GDS.
4. Are any DTCs present ?

**YES** ▶ Go to the applicable troubleshooting procedure.

**NO** ▶ System is performing to specification at this time.

# P1696 Immobilizer-Authentication Fail

## Component Location




VG12SK50P169611

## General Description

Smart key System consists of transponder, which is in the FOB key head, and Smart key ECM. Smart Key System has FOB holder, which includes antenna coil, to communicate with transponder for immobilizer communication.

Smart Key ECM communicates with PDM via serial communication line so that Smart Key ECM sends signal to PDM.

FOB is requested authentication from Smart Key ECM by using the LF antenna with LF communication. And then, FOB sends authentication signal through the SRx with RF communication.

With this procedure, Smart Key ECM sends authentication signal to Engine ECM in order to allow the engine start.

Authentication for immobilizer is classified two different way. one is pre- authentication and the other is general authentication.

Regardless of success or failure, Pre-authentication makes Immoblizer lamp remains OFF. However, General authentication makes Immobilizer lamp is ON for 30 seconds If authentication is successful. However, if authentication is failed, Immobilizer lamp is OFF for 10 seconds.

■ Condition for Pre-authentication.

1. OFF and Driver door is open when FOB is in passenger compartment

(Seek every 3 seconds for 30 seconds.)

2. OFF and Driver door is close when FOB is in passenger compartment

3. FOB is inserted in FOB Holder

4. Pressing Brake padel when FOB is in passenger compartment

■ Condition for general authentication

1. Pressing start butteon when FOB is in the passenger compartment

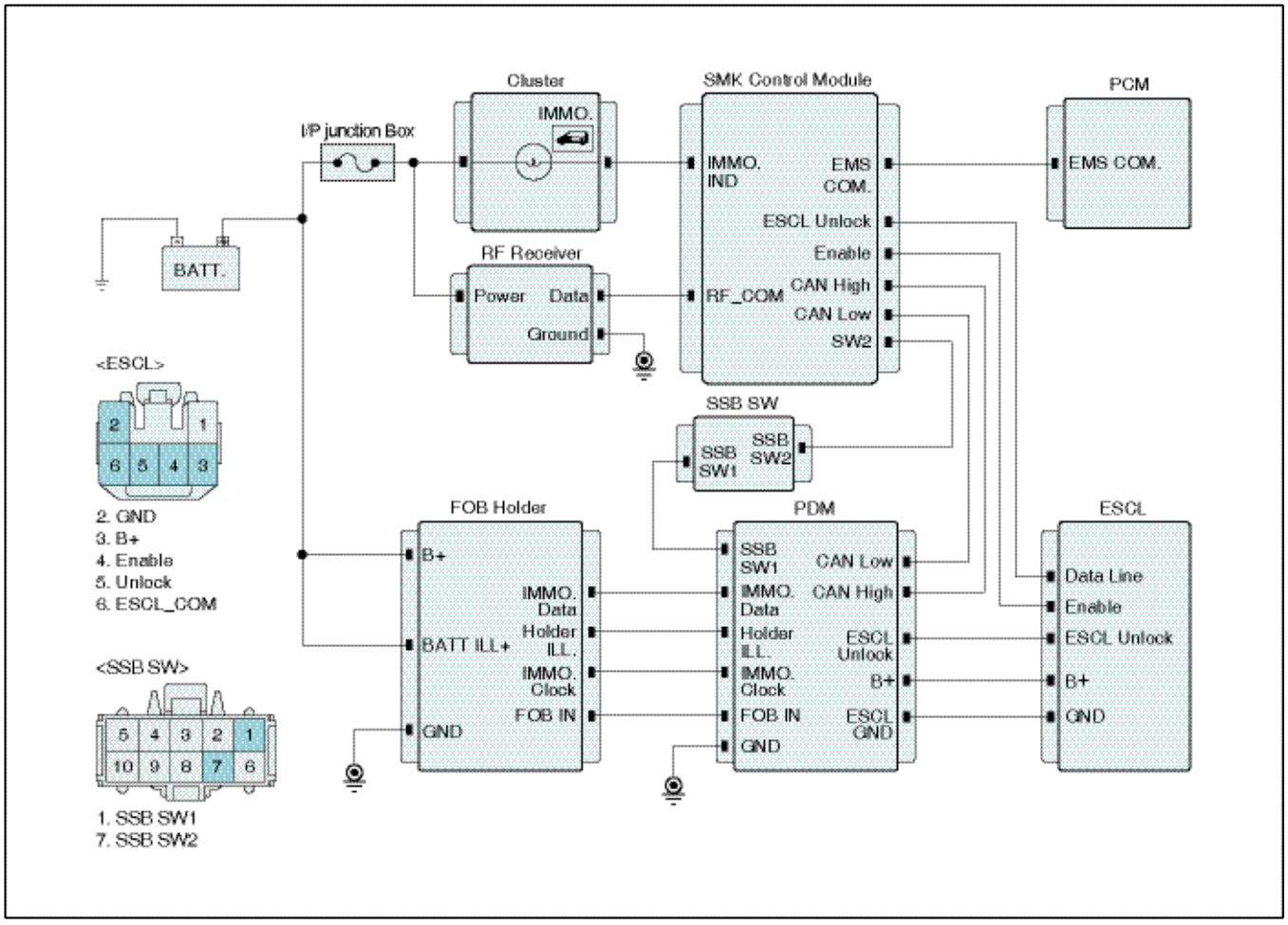
## DTC Description

During the Immobilizer authentication, If there is any wrong VIN(Vehicle Identification Number) or MIN(Model Identification Number) signal on the communication message, PCM sets DTC P1696

DTC Detecting Condition

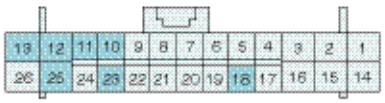
| Item | Detecting Condition | Possible Cause |
|---|---|---|
| Enable Conditions | • IG ON | 1. Faulty Smart key PCM |
| Detecting time | • 1 time | |
| Threshold value | • Wrong VIN(Vehicle Identification Number), MIN(Model Identification Number)<br>- No DTC P1676 but wrong VIN or MIN | |

Diagnostic Circuit



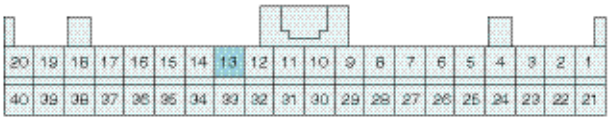

VG12SK50P1676D

<SMK Control Module>



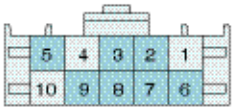
2. IMMO.IND
10. B-CAN High
11. B-CAN Low
12. ESCL_COM
13. RF_COM
18. ESCL_Enable
23. SSB SW2
25. EMS_COM

<Instrument Cluster>



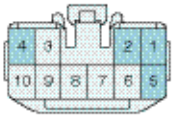
13. IMMO. IND

<FOB Holder>



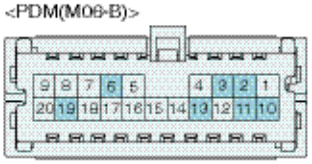
2. IMMO. Clock
3. Holder ILL(-)
5. GND
6. BATT. ILL(+)
7. IMMO. Data
8. B+
9. FOB IN

<PDM(M06-A)>



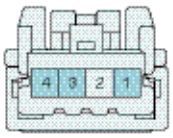
1. 2. GND
4. ESCL B+
5. ESCL GND

<PDM(M06-B)>



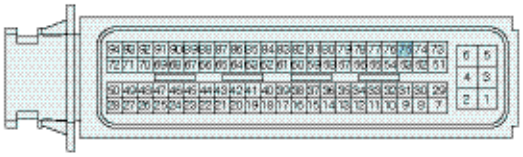
2. IMMO.Clock
3. IMMO.Data
6. SSB SW1
10. B-CAN Low
11. B-CAN High
12. FOB In
13. ESCL_Unlock
19. Holder ILL.

<RF Receiver>



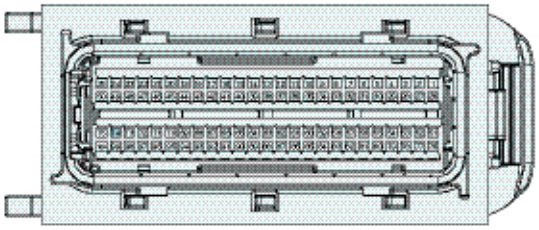
1. RF_COM
3. B+
4. GND

<PCM(G4KE)>



75. EMS_COM

<PCM(G6DC)>



74. EMS_COM

VG12SK50P1676D1

## Monitor Scantool Data

1. IG KEY "ON" & Engine "OFF".
2. Erase DTC after connecting GDS.
3. Check Smart Key ECM status parameter if DTC is retrieved.

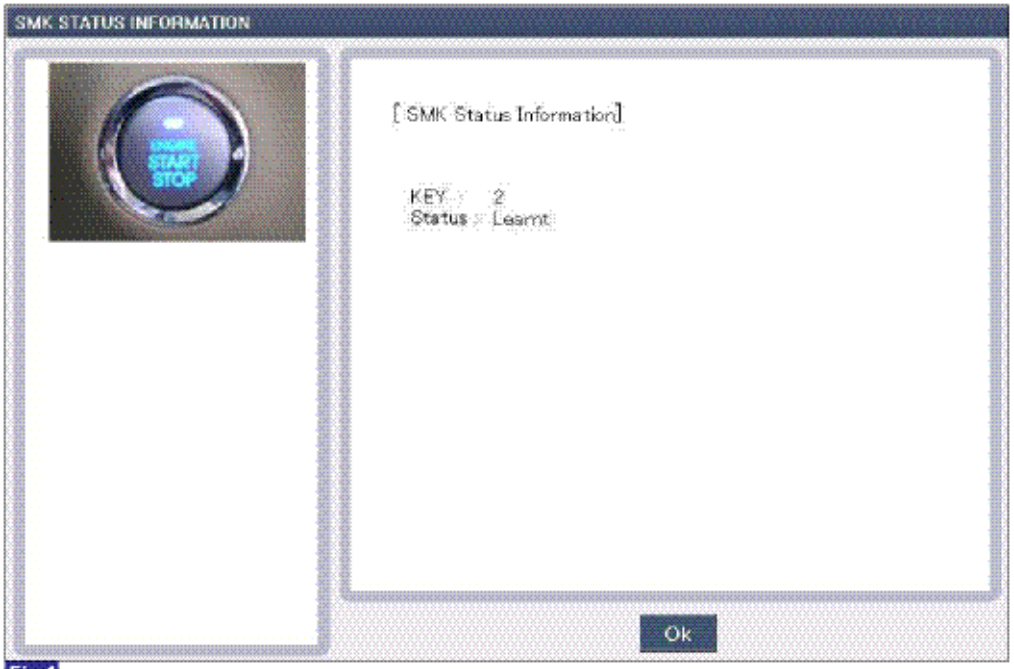



Fig.1

SXMBE10K11L

Fig.1) It shows that 2(two) FOB key is registered, Smart Key ECM is learnt status.

4. Is the smart Key ECM learnt ?

**YES** ▶ Fault is intermittent caused by poor contact in Smart key ECM and/or PCM's connector or was repaired and Smart key ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

**NO** ▶ Go to "Component Inspection" procedure.

## Component Inspection

■ Check Smart Key ECM insepction

1. IG KEY "ON" & Engine "OFF"
2. Neutralize smart key ECM with GDS.
3. Perform key teaching procedure for smart key ECM with GDS.

   ⚠CAUTION
   Pin code must be prepared to Neutralize Smart Key ECM and to perform key teaching procedure.
4. Is the neutralization of Smart Key ECM, Engine ECM and key teaching normal ?

**YES** ▶ Fault is intermittent caused by poor contact in Smart Key ECM and/or ECM's connector or was repaired and Smart key ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

**NO** ▶ Substitute with a known-good Smart Key ECM and check for proper operation.
▶ If the problem is corrected, replace Smart Key ECM and then go to "Verification of Vehicle Repair" procedure.

NOTICE

■ *PIN code is programmed in Smart key ECM, Transponder, ESCL, PDM and FOB.*

1. *If the Smart key ECM is not registered with PIN, key teaching process is not proceeded*
2. *Registering PIN is available after Smart Key ECM is neutralized.*
3. *Neutralization of Engine ECM is available with GDS (Registering PIN code)*
4. *If the virgin engine ECM is installed on vehicle, Engine ECM is automatically programmed PIN code by Smart Key ECM*
5. *Registering PIN code is only possible for virgin or neutralized status.*

■ *It is possible to acess to All of the learning*

*procedue only with GDS.*

*And, FOB key must be inserted in FOB holder in order to proceed learning procedure.*

*(There is only one menu for registering Smart key on the GDS that makes registering all of the component. In case of replacing each module, New registration should be done with GDS)*

- *Smart Key ECM Learning*

  *1. Before learning procedure for FOB Key, PDM or ESCL, Smart Key ECM should be registered PIN code first.*

  *2. In case of replacing Smart Key ECM, All of the keys should be newly registered again.*

  *3. In case that Smart Key ECM receives 3 times with wrong PIN, It is not allowed for neutralization and Key Teaching for 1 hour.*

  *4. If the battery is discharged during neutralization or Teaching, Timer will start again from begining. Therefore, it is avoidable to wail for 1 hour.*

- *PDM Learning*

  *1. It is O.K for registering PDM just one time. And, it is available for PDM to neutrailze and re-teach with same PIN code.*

  *2. In case that Power supply is shut off to ESCL right before first FOB key is registered, Every component status is moved to right before power shut off and previous PIN is used for communication with PDM and IPM*

- *ESCL Learning*

  *1. It is O.K for registering ESCL just one time. And, it is available for ESCL to neutrailze and re-teach with same PIN code.*

## Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect GDS and check "No. of Key learnt, ECM status and Smartkey ECM status
2. Selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC
3. Operate the vehicle within the enable condition and monitor the DTC on the GDS.
4. Are any DTCs present ?

**YES** ▶ Go to the applicable troubleshooting procedure.

**NO** ▶ System is performing to specification at this time.

## P1699 Immobilizer-Twice Overtrial

### Component Location


VG12SK50P169911

### General Description

This is special function that engine can be started for moving to an area where the key learning is processed with twice IG ON. This function is only performed in condtion that Engine EMS, Smart key unit, Transponder, PDM and ESCL are all virgin status.

Engine can be started by the sequence.

■ Ignition ON with no cranking, Ignition OFF, Ignition ON with cranking within a time interval

■ The following timing conditions have to be fulfilled for successful start :

- Engine EMS, Smart key ECM, Transponder, PDM are all virgin status

1. First Ignition ON more than 0.5 seconds and less than 1.5 seconds.
2. Ignition OFF time is limited by the minimum of 0.2 seconds and the maximum of 1.5 seconds.
3. Ignition ON

The number of engine starts by "twice ignition on" is limited. The maximum value is 32 times regardless of cranking.

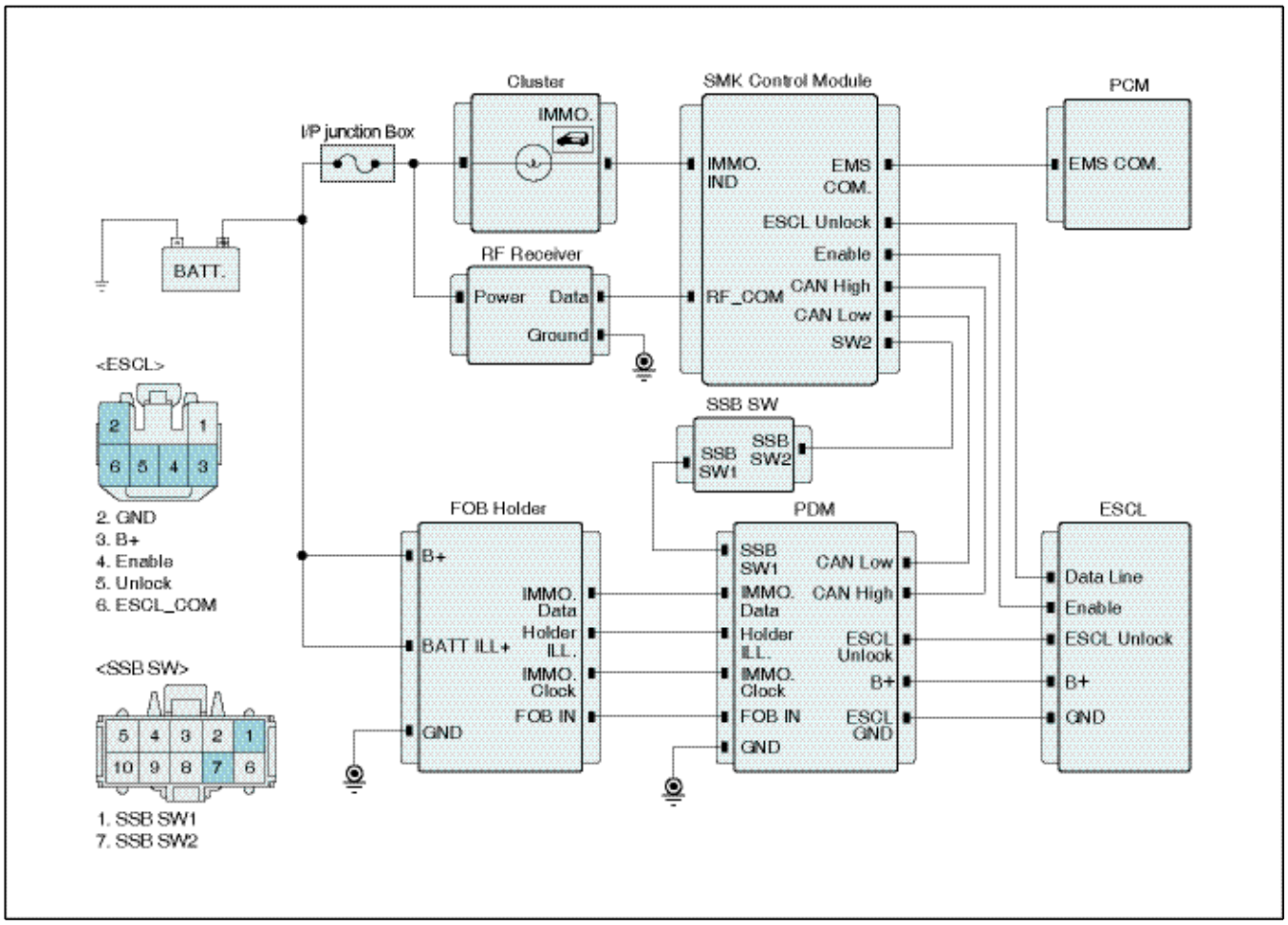
### DTC Description

DTC P1699 is set if twice ignition ON exceeds maximum limit over 32 times.

### DTC Detecting Condition

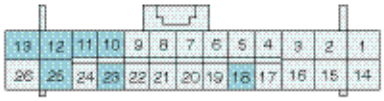
| Item | Detecting Condition | Possible Cause |
|---|---|---|
| Enable Conditions | • IG ON | 1. Exceed the maximum limit of Twice IGN ON |
| Detecting time | • Exceed the maximum limit of Twice IGN ON (Over 32 times) | |

## Diagnostic Circuit



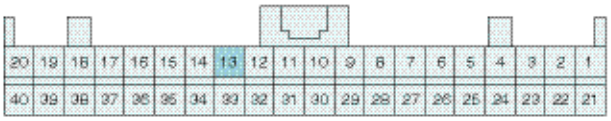

VG12SK50P1676D

<SMK Control Module>



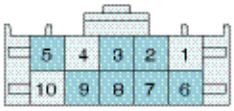
2. IMMO.IND
10. B-CAN High
11. B-CAN Low
12. ESCL_COM
13. RF_COM
18. ESCL_Enable
23. SSB SW2
25. EMS_COM

<Instrument Cluster>



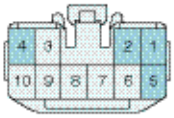
13. IMMO. IND

<FOB Holder>



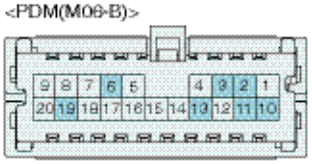
2. IMMO. Clock
3. Holder ILL(-)
5. GND
6. BATT. ILL(+)
7. IMMO. Data
8. B+
9. FOB IN

<PDM(M08-A)>



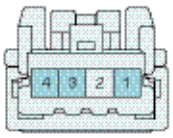
1. 2. GND
4. ESCL B+
5. ESCL GND

<PDM(M08-B)>



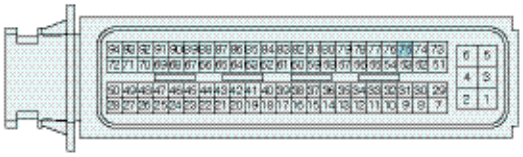
2. IMMO.Clock
3. IMMO.Data
6. SSB SW1
10. B-CAN Low
11. B-CAN High
12. FOB In
13. ESCL_Unlock
19. Holder ILL.

<RF Receiver>



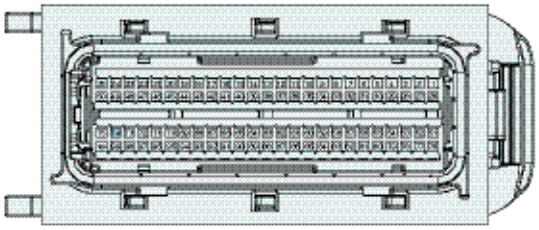
1. RF_COM
3. B+
4. GND

<PCM(G4KE)>



75. EMS_COM

<PCM(G6DC)>



74. EMS_COM

VG12SK50P1676D1

## Monitor Scantool Data

1. IG KEY "ON" & Engine "OFF"
2. Erase DTC after connecting GDS
3. Check SMK status if DTC is retrieved.

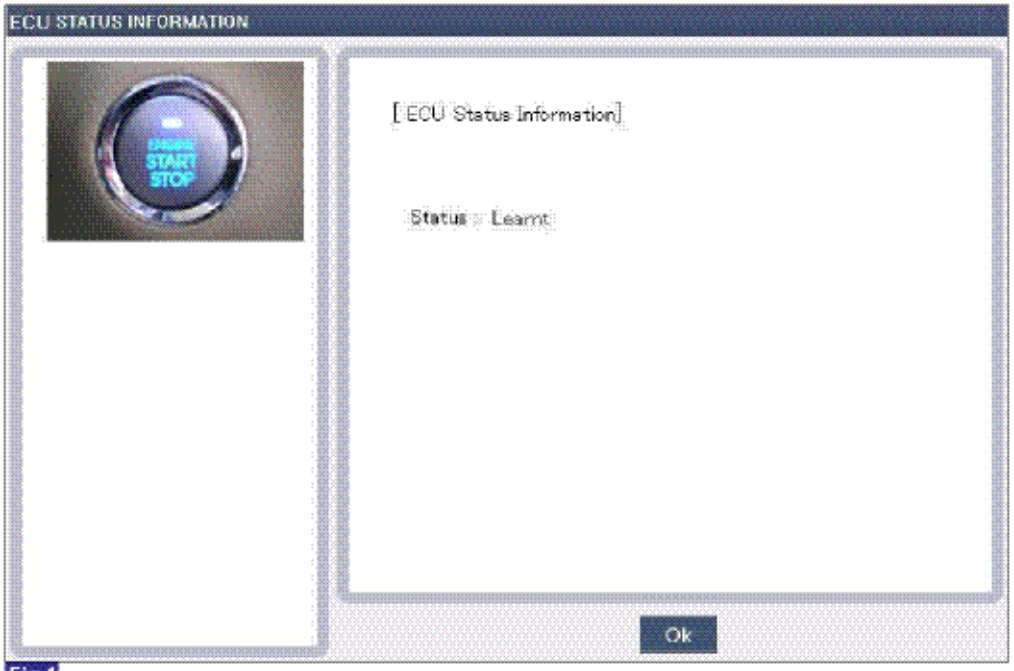



Fig.1

SXMBE10K12L

Fig. 1 : It shows that 2(two) FOB key is registered, Smart Key unit is virgin status.

4. Is the ECM status displayed "Lock" ?

**YES** ▶ Fault is intermittent caused by poor contact in Smart key unit and/or Smart key unit's connector or was repaired and Smart key unit memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

**NO** ▶ Go to "Component Inspection" procedure.

## Component Inspection

Check Smart Key unit insepction

1. IG KEY "ON" & Engine "OFF"
2. Neutralize smart key unit with scantool.
3. Perform key teaching procedure for smart key unit with scantool.

⚠CAUTION

Pin code must be prepared to Neutralize Smart Key unit and to perform key teaching procedure.

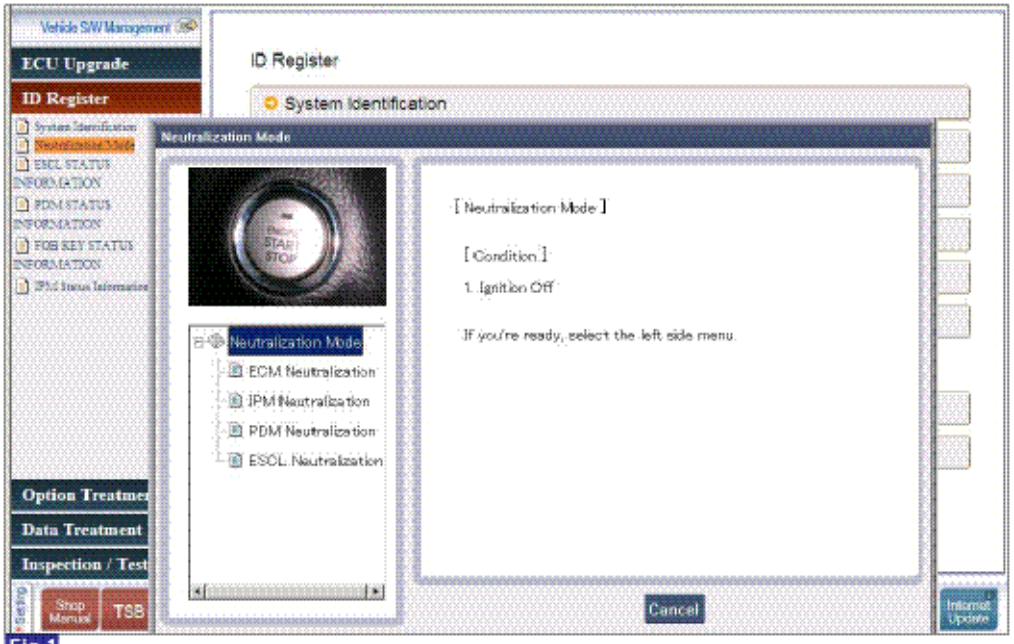



Fig.1

VG12SK50P169912S

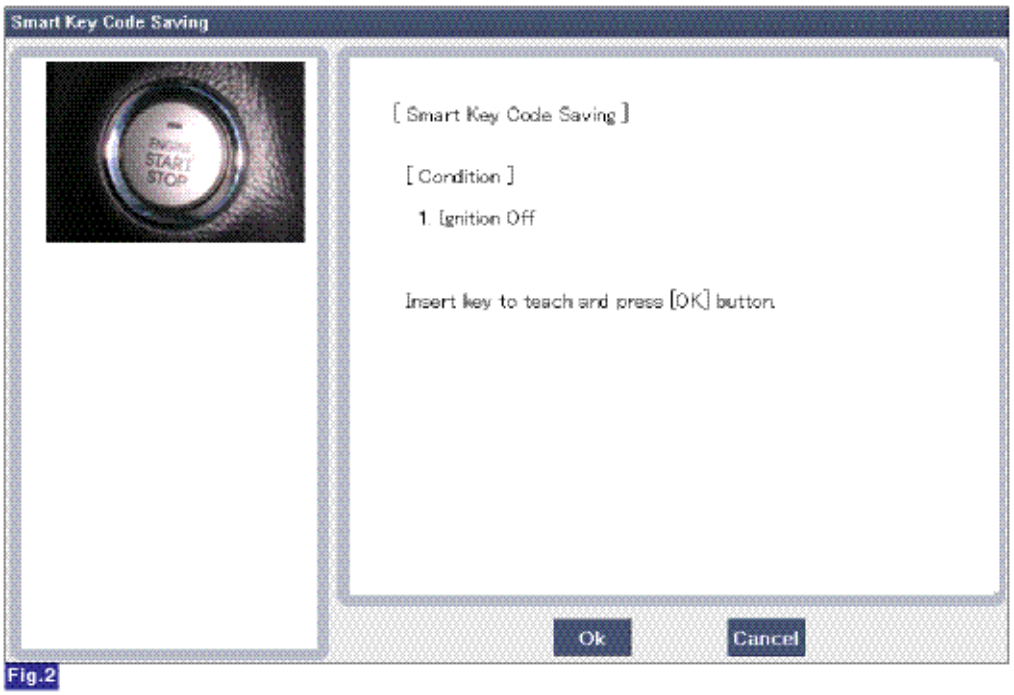



Fig.2

VG12SK50P169913S

Fig.1) Neutralization

Fig.2) Key Teaching

4. Is the neutralization of Smart Key unit, Engine ECM and key teaching normal ?

**YES** ▶ Fault is intermittent caused by poor contact in Smart key unit and/or ECM's connector or was repaired and Smart key unit memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to " Verification of Vehicle Repair" procedure.

**NO** ▶ Substitute with a known-good Smart Key unit and check for proper operation.
If the problem is corrected, replace Smart Key unit and then go to "Verification of Vehicle Repair" procedure.

NOTICE

■ *PIN code is programmed in Smart key ECM, Transponder, ESCL, PDM and FOB.*

1. *If the Smart key ECM is not registered with PIN, key teaching process is not proceeded*
2. *Registering PIN is available after Smart Key ECM is neutralized.*
3. *Neutralization of Engine ECM is available with GDS (Registering PIN code)*
4. *If the virgin engine ECM is installed on vehicle, Engine ECM is automatically programmed PIN code by Smart Key ECM*
5. *Registering PIN code is only possible for virgin or neutralized status.*

■ *It is possible to acess to All of the learning procedue only with GDS.*

*And, FOB key must be inserted in FOB holder in order to proceed learning procedure.*

*(There is only one menu for registering Smart key on the GDS that makes registering all of the component. In case of replacing each module, New registration should be done with GDS)*

- *Smart Key ECM Learning*

  *1. Before learning procedure for FOB Key, PDM or ESCL, Smart Key ECM should be registered PIN code first.*

  *2. In case of replacing Smart Key ECM, All of the keys should be newly registered again.*

  *3. In case that Smart Key ECM receives 3 times with wrong PIN, It is not allowed for neutralization and Key Teaching for 1 hour.*

  *4. If the battery is discharged during neutralization or Teaching, Timer will start again from begining. Therefore, it is avoidable to wail for 1 hour.*

- *PDM Learning*

  *1. It is O.K for registering PDM just one time. And, it is available for PDM to neutrailze and re-teach with same PIN code.*

  *2. In case that Power supply is shut off to ESCL right before first FOB key is registered, Every component status is moved to right before power shut off and previous PIN is used for communication with PDM and IPM*

- *ESCL Learning*

  *1. It is O.K for registering ESCL just one time. And, it is available for ESCL to neutrailze and re-teach with same PIN code.*

## Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

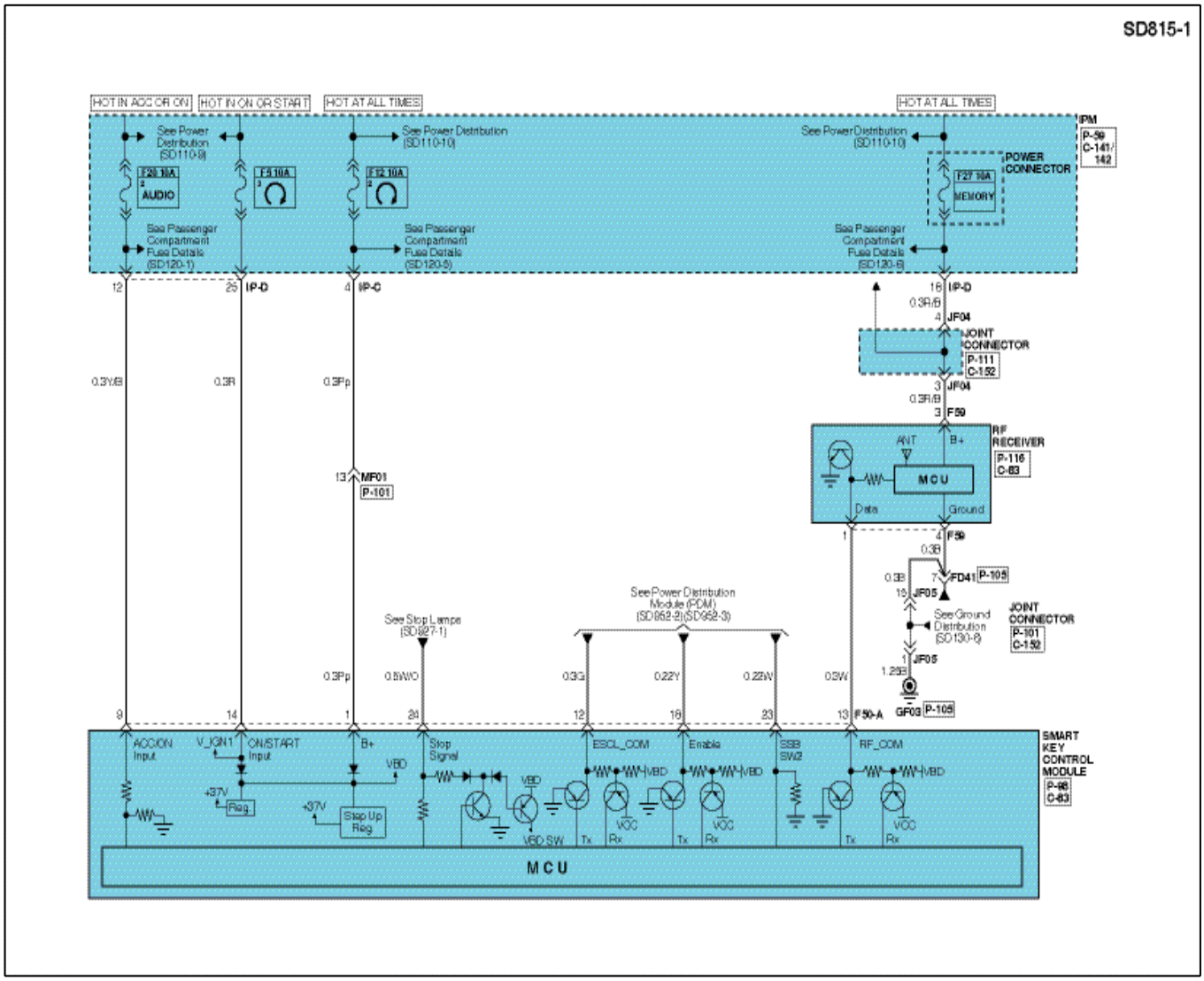
1. Connect GDS and check "No. of Key learnt, ECM status and Smartkey ECM status
2. Selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC
3. Operate the vehicle within the enable condition and monitor the DTC on the GDS.
4. Are any DTCs present ?

**YES** ▶ Go to the applicable troubleshooting procedure.

**NO** ▶ System is performing to specification at this time.

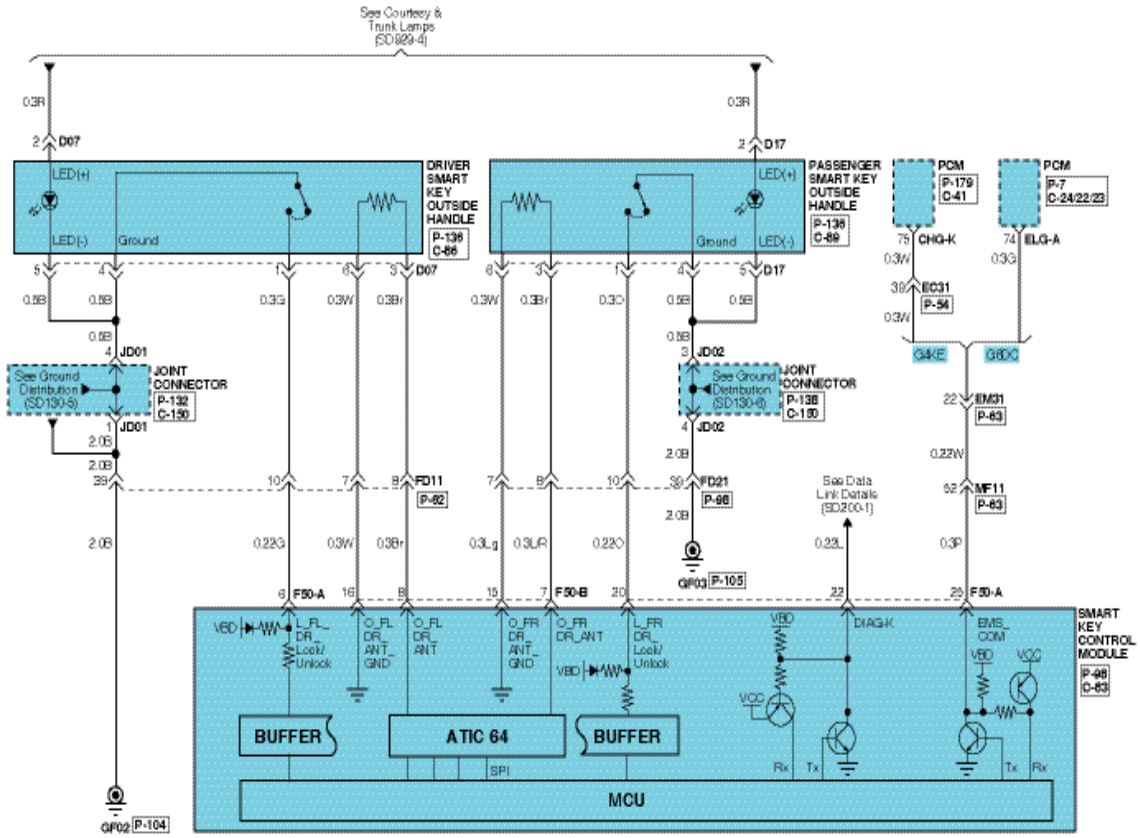
## FC00 DTC 가이드 전체회로도 입력用

Full Circuit Digram



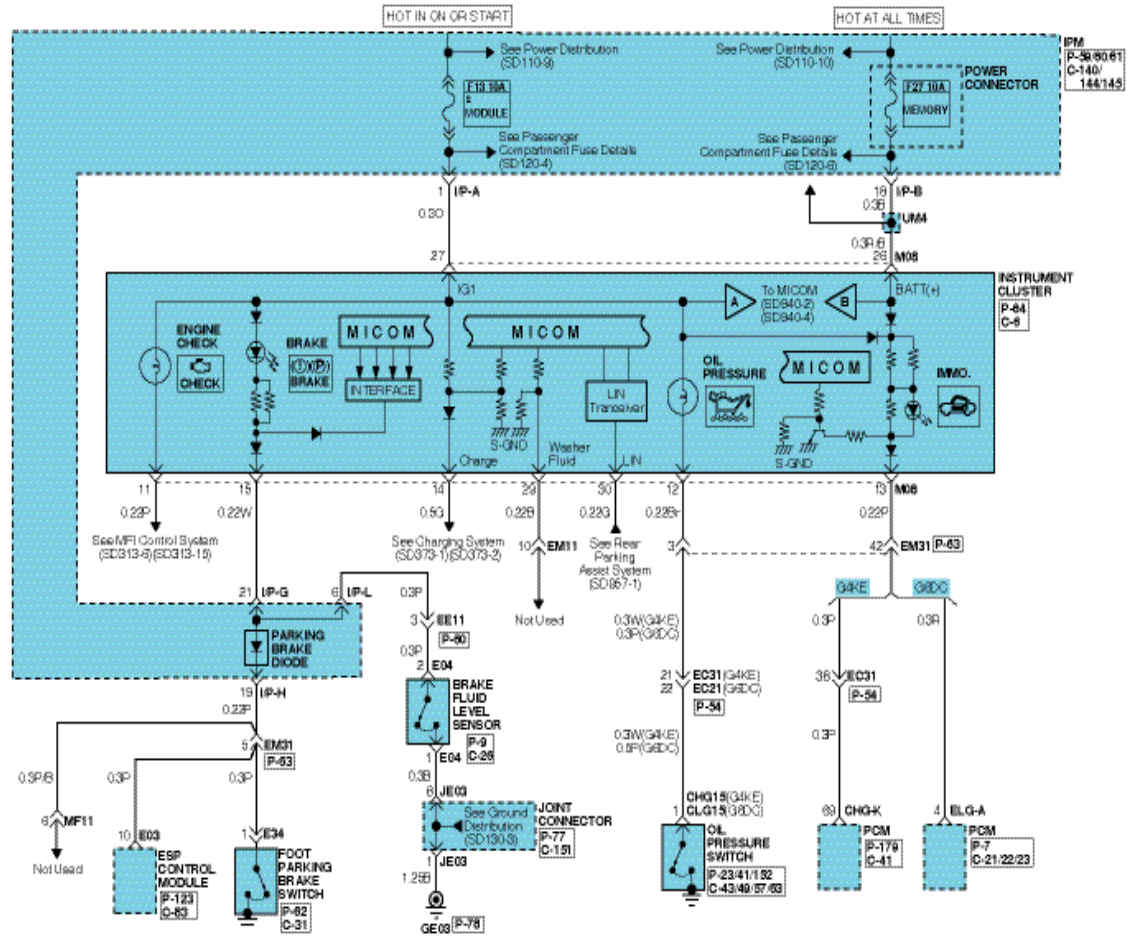

VG12SK50815-1

SD815-2



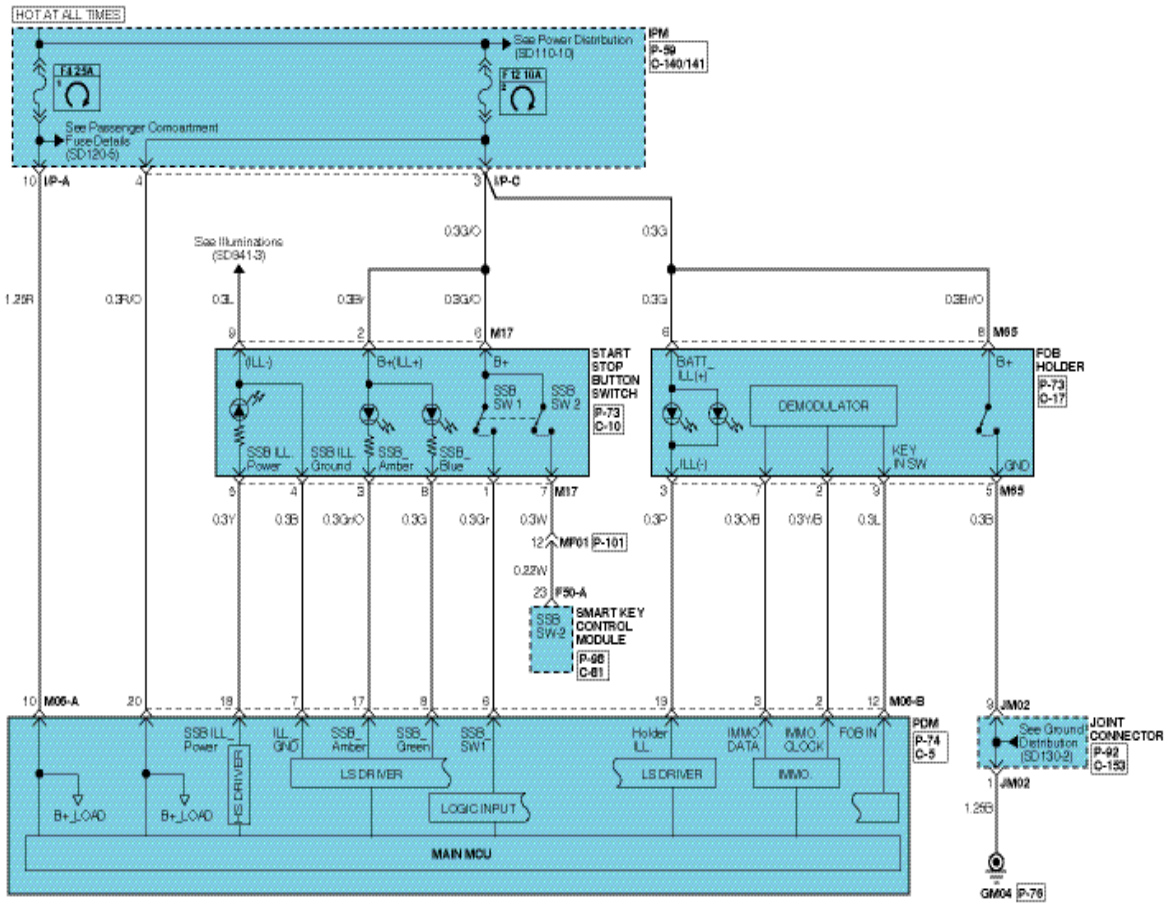

VG12SK50815-2

SD940-1




VG12SK50940-1

SD952-2




VG12SK50952-2